

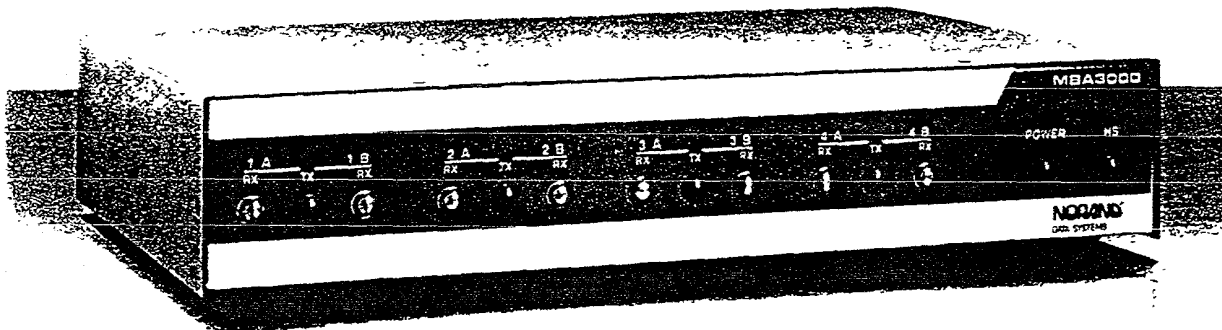
APPENDIX A

Brochure entitled "MBA3000 Multiple
Base Adapter" (Two Sides)
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The NORAND® MBA3000 Multiple Base
Adapter Dramatically Extends the Radio
Frequency Coverage Area

**MBA3000
Multiple Base
Adapter**



SYSTEM FEATURES

- Increases UHF coverage range by up to 400%
- Dual independent receiving improves contention response time during heavy RF transmission activity
- Supports multiple remote warehouses over standard telephone lines
- Dynamic time-division multiplexing, simulcast transmissions, and dual independent receiving provides the best possible RF coverage for the most difficult RF environments
- Allows up to 8 base stations to be operated when used in conjunction with the NORAND® RC2250, RC3240, and the RC3250 Network Controllers

The new MBA3000 Multiple Base Adapter from Norand Corporation increases the RC2250, RC3240, or RC3250 Network Controller UHF base support from 2 bases to up to 8 bases. This increased support increases UHF coverage range by up to 400% and is ideal for multiple remote warehouse facilities.

Dynamic time-division multiplexing insures adequate response time no matter where the RF terminal is located. The Multiple Base Adapter implements simulcast transmissions to allow for increased range without loss of user response time. Dual independent receiving improves contention response time during heavy RF transmission activity.

The MBA3000's operation is controlled by the RC2250, RC3240, or RC3250 Network Controller. It is a free standing unit that can be stacked or mounted horizontally.

The combination of dynamic time-division multiplexing, simulcast transmissions, and dual independent receiving provides the best possible RF coverage for the most difficult RF environments.

NORAND®
DATA SYSTEMS

MBA3000 Multiple Base Adapter

SPECIFICATIONS

PRODUCT FEATURES

Simulcast Mode: Allows the use of 1 to 8 base transceivers where the bases are configured as 4 pairs of 2 bases using the dynamic time-division multiplexing method

Sequential Mode: Allows the use of 1 to 4 bases with the RC3240/RC3250 Network Controller only using the dynamic time-division multiplexing method

Power Accessories: NC3000 external 12 volt DC power supply or a power cable to the RC2250 are available

Controller Interface: RS232 cables from the RC2250 Network Controller to the MBA3000

OR

RS232 cables from the RC3240/RC3250 Network Controller to the MBA3000

OR

Single RS232 cable from the RC3240/RC3250 Network Controller to the MBA3000 for sequential mode

Base Radio Interface: RS422 cable from the MBA3000 to the RB3000 or RB2212 Base Radios

OR

RS232 cable from the MBA3000 to the RB3000 or RB2212 Base Radio

OR

RS232 cable to modem

Light Emitting Diode (LED): There are 14 LEDs including, "Power," "High Speed," Four "Transmit LEDs for each Channel," and Eight "Receiving LEDs for each of the Eight Base Ports"

Communications Ports: There are 10 communication ports, two 9-pin D-sub for connection to the controller and eight 25-pin D-sub for connection to bases

PHYSICAL CHARACTERISTICS

Size: 14" x 2.5" x 10" (LWD)
(35.56cm x 6.35cm x 25.4cm)

Weight: 6 pounds (2.7kg)

ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: 32° to 122°F (0° to 50°C)

Storage Temperature: -40° to 158°F (-40° to 70°C)

Humidity: 0 to 95% noncondensing

Static Shock Protection: The MBA3000 is unaffected by a 15kV static discharge to any exterior surface or attachable cord during tests conducted with a 150 ohm probe

Radio Frequency Interference: The MBA3000 will not radiate or conduct electromagnetic emissions in excess of the level described by the FCC part 15, Subpart J, Class A Standard for computing devices

NORAND®
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APPENDIX B

Brochure entitled "RB2212 Base
Radio Transceiver" (Two Sides)
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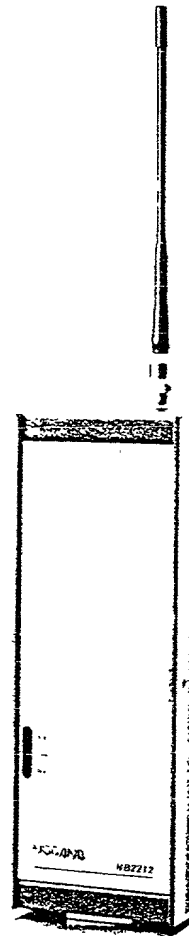
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The NORAND® RB2212 Base Radio Transceiver is the Wireless Interface to Your Host Computer

Portable radio data terminals constitute the latest technological advance in the utilization of computer power. Radio terminals add a new dimension to computers by extending their power to control transactions where they occur. But utilization of radio terminals can only be successful if communications with the host computer are reliable. The RB2212 Base Radio Transceiver from Norand is designed to provide a radio communication link as reliable as a direct cable connection to your host computer.

To accomplish this, we designed the base transceiver with a high-performance, digital data radio instead of modifying a radio designed for voice communications. This ensures high-speed, reliable data communications between the host computer and the radio data terminals. And the RB2212 is designed to operate in rugged environments, allowing an extended range of radio communications beyond the point where modified voice radios will fail.

Add up the features and you'll understand why the RB2212 and all of the radio data products from Norand set the industry standard for performance and reliability.



FEATURES:

- High-performance radio designed for data communications
- High-speed radio communications
- Operational status indicators
- System compatibility with all NORAND® RF hand-held terminals

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• The Radio Data Network

The NORAND® RB2212 Base Radio Transceiver is a component of a complete radio data network. The network consists of a communications multiplexer, the RB2212 Base Radio Transceiver, and up to 16 radio data terminals. The radio data network extends your computing power by providing interactive communications between the host computer and the remote areas of your facility.

The portable element of the radio data network is the radio data terminal. Terminals are carried throughout your facility to put the power of your host computer where the action is.

The terminals communicate with the host computer via the RB2212 Base Radio Transceiver and the communications multiplexer. The RB2212 is the radio link to the terminals, utilizing a high-performance digital data radio to ensure reliable communications.

The RB2212 is controlled by the communications multiplexer, which manages the network communications and direct data transfer between the terminals and the host computer. The communications multiplexer communicates with the host computer via an RS232 interface cable.

RB2212 Base Radio Transceiver SPECIFICATIONS

Product Features:

Indicators: Light Emitting Diode (LED) indicators reflect transceiver status (TXD [transceiving], RXD [receiving])

Case: Two-toned (industrial dark gray and industrial light gray) aluminum wall-mounted case provides excellent electrical shielding and ground plane for the radio.

Radio Characteristics:

Radio Transceiver: Compact, high-performance digital data radio.

Radiated Power: 2 watts nominal

Frequency Range: 450 to 470 MHz

Physical Dimensions:

Size: 3.3" x 1.6" x 15.3" (LWH)
(8.4cm x 4.1cm x 38.9cm)

Weight: 1.4 pounds (0.6kg)

Environmental Characteristics:

Temperature:

Operating: 14° to 122°F
(-10° to 50°C)

Storage: -22° to 158°F
(-30° to 70°C)

Humidity: 10 to 90%
noncondensing

Altitude: To 10,000 feet
(3,048 meters) above sea level

NORAND®
DATA SYSTEMS

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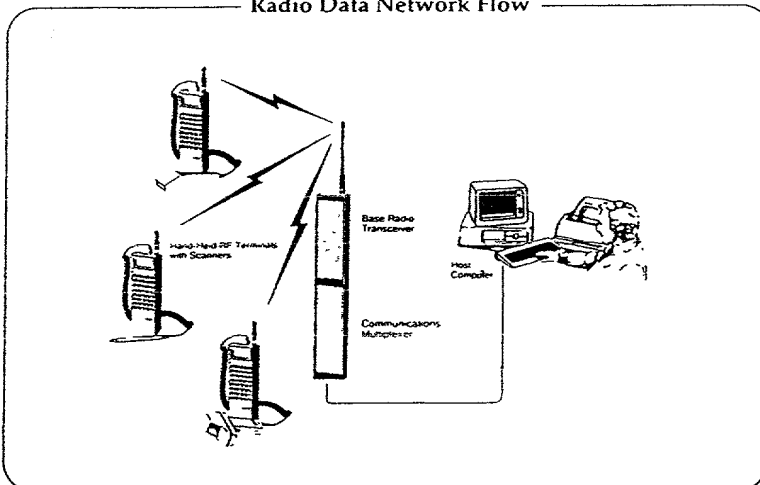
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Radio Data Network Flow



APPENDIX C

Brochure entitled "RB3000 Base
Radio Transceiver" (Two Sides)
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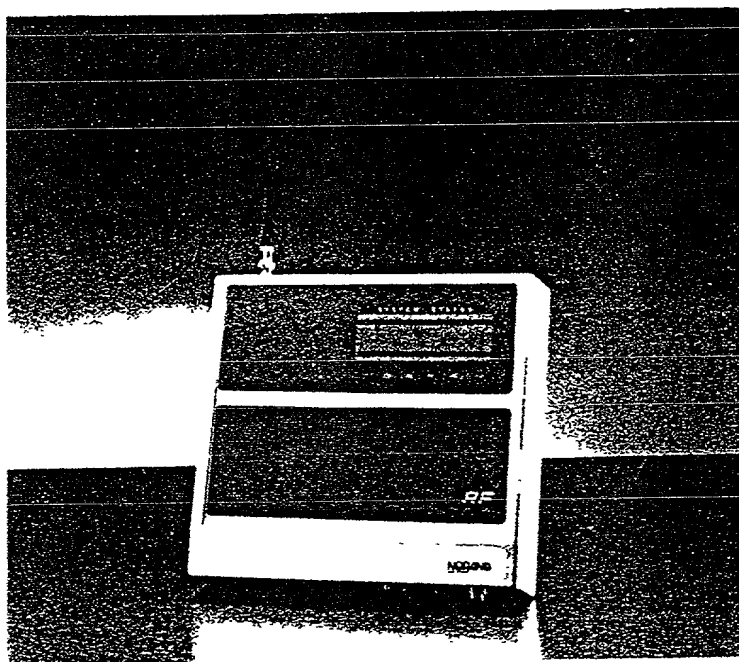
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Developed for industrial and warehouse applications, where voice radio systems are often already in use, the RB3000 was designed to reject unwanted signals from other systems and to be less likely to interfere with neighboring radio networks.

The RB3000 utilizes a third-generation, high-performance digital transceiver enhanced for 9600 bit-per-second (BPS) operation. The RB3000 can provide better throughput than a 4800 BPS base radio when combined with our patented Real-Time Control™ radio link communication protocol and baud rate switching. It provides improved throughput by compensating for the range and error rate problems associated with radio communications at 9600 BPS. And we've maintained compatibility with all NORAND RF hand-held terminals.

Consider the importance of reliable, fast communications to your operation and you'll see why the RB3000 is the best solution

The NORAND RB3000 Base Radio Transceiver is a component of a complete radio data network. The network consists of a communications multiplexer (or controller), the RB3000 Base Radio Transceiver and up to 127 terminals. The maximum number of terminals depends on the type of multiplexer or controller selected and whether the host interface is asynchronous or SNA/SDLC.



The portable element of the system is the radio data terminal. Terminals are carried throughout your facility to put the power of your host computer where the work needs to be done. Norand offers a variety of terminals designed for different operating conditions.

The terminals communicate with the host computer via the RB3000 Base Radio Transceiver and communications multiplexer (or controller). The RB3000 utilizes a high-performance digital data radio to ensure reliable communications.

The RB3000 is controlled by the communications multiplexer (or controller) which manages the radio network communications and data transfer between the terminals and the host computer. The communications link between the multiplexer (or controller) and the RB3000 can be via an RS232 or RS422 interface cable.

- High-performance third-generation radio designed for data communications
- Patented Real-Time Control™ protocol and baud rate switching for reliable 4800 BPS or 9600 BPS communications
- System compatibility with all NORAND® RF hand-held terminals
- Operational status indicators

RB3000 Base Radio Transceiver

SPECIFICATIONS

Product Features:

Indicators: Light Emitting Diode (LED) indicators reflect transceiver status (ON [power on], TX [transmitting], RX [receiving], HS [9600 BPS operation])

Radio Link Transmit Speed (Bits-Per-Second): 4800 (with communications multiplexer), 9600 (with network controller), 4800/9600 Baud Rate Switching* (with network controller)

Base Radio Serial Interface:
RB3000 - RS232
RB3001 - RS422

Case: Molded polymer
wall-mounted case

Radio Characteristics:

Radio Transceiver: High-performance, third-generation digital data radio enhanced for 9600 BPS operation

Radiated Power: 2 watts nominal

Frequency Range: 450 to 470 MHz

Physical Dimensions:

Size: 11.5" x 2.5" x 10.2" (LWH)
(29.5cm x 6.4cm x 26.2cm)

Weight: 3 pounds (1.36kg)

Environmental Characteristics:

Temperature:

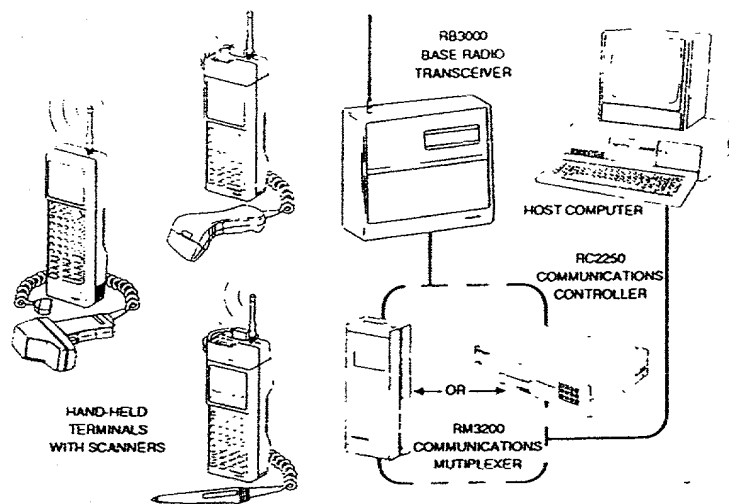
Operating: -4° to 122°F
(-20° to 50°C)

Storage: -22° to 140°F
(-30° to 60°C)

Humidity: 10 to 90%
noncondensing

Altitude: To 10,000 feet
(3,048 meters) above sea level

Radio Network Data Flow



NORAND®
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APPENDIX D1

Brochure entitled "RT2210XL Radio
Data Terminal" (Six Sides)
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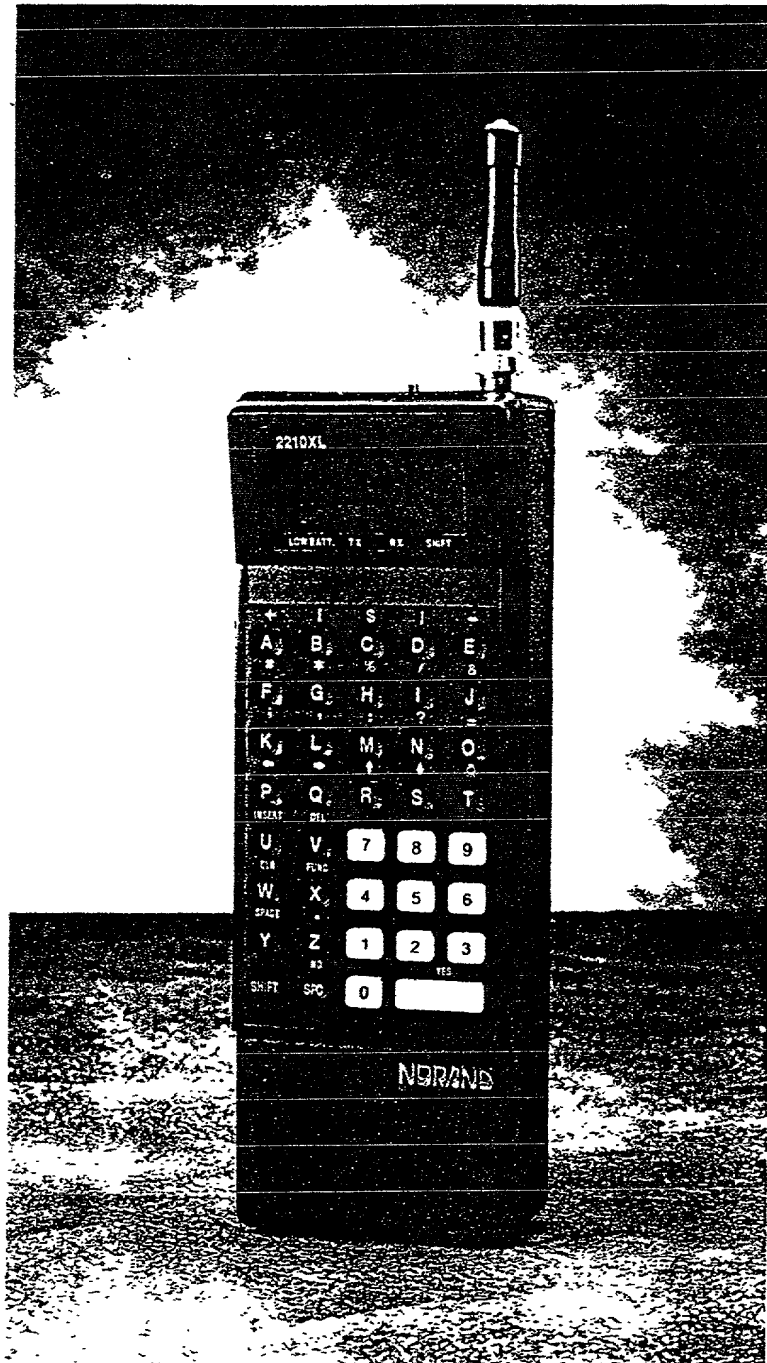
The NORAND® RT2210XL Radio Data Terminal Puts the Power of Your Host Computer Where You Need it Most

The RT2210XL Radio Data Terminal from Norand is a wireless, interactive terminal which provides a new freedom in data collection and communication. The newly designed, ruggedized terminal extends the benefits of computerization by putting the power of your computer wherever you need it the most.

The terminal provides the link between your host computer and remote areas of your facility. The combination of data communications and two-way FM radio technology allows you to control transactions as they occur. The addition of high-speed bar code scanning gives you a real-time data collection system that delivers unsurpassed, bottom line results.

FEATURES:

- Lightweight, wireless portability with two-way, interactive data communication capabilities
- Compact, ruggedized design
- High performance radio providing optimum coverage for data communications
- High resolution display (64-character) with backlighting
- Bar code scanning support



The RT2210XL Has the Features You're Looking For

- **Wireless Portability**

Traditionally, the only access to a computer was from a hard-wired terminal station. As computers take on a greater portion of the inventory, accounting, and purchasing burden, the need to enter information into the host computer from remote areas of a facility becomes even more apparent. The RT2210XL gives you the portability that you need, while maintaining the data integrity of the hard-wired computer terminal.

- **High-Performance Data Radio**

The NORAND® RT2210XL uses a high-performance, second generation data communication radio, different from the radio devised for voice communications. The Norand radio is specially designed to optimize data transmission/reception. It performs where voice radios fail.

- **Two-Way Interactive Data Communications**

The RT2210XL Radio Data Terminal permits two-way data communications between the terminal and

the host computer. Whether it's providing lightning-fast price verification in a retail store or inventory updates in an industrial setting, interactive data communications deliver results.

- **Compact, Ruggedized Design**

The digital components, radio, a 39-key alphanumeric keyboard, and battery pack of the RT2210XL are housed in a compact, ruggedized package which fits in one hand. This lightweight unit weighs only 2 pounds (907g), making it ideal for operating hours without fatigue.

- **Liquid Crystal Display (64-Character)**

The user of the hand-held terminal can view up to 4 lines by 16 characters each on the 1 inch x 2.25 inch (2.54cm x 5.72cm) display. Features of the display include large, easy-to-read characters and four status indicators, allowing you to determine the terminal's state of operation at a glance. The display also incorporates backlighting for low light environments or nighttime operation.



Ensuring pricing accuracy is one of the many advantages of using the RT2210XL Radio Data Network in the retail industry.

- **Bar Code Scanning Support**

The hand-held RT2210XL supports all major bar code symbologies and is designed to interface with a wide variety of bar code scanning devices. NORAND 20/20 CCD Bar Code Scanners, light pens, LS8110 Laser Scanners, as well as various third-party scanners are all supported by the standard RT2210XL.

An optional direct-laser scan feature is also available for 5-volt helium-neon laser and laser-diode scanners like our LS7000, LS8100, and LS8500 Laser Scanners (as well as compatible third-party scanners). This option eliminates the need for an external communication interface or power supply.

- **Available Options**

To meet individualized needs, several options are available to complement the RT2210XL's standard features. These options include:

- direct laser scanning capability.
- non-volatile memory
- numeric keyboards (20-key).



Real-time inventory control in industrial environments can be accomplished quickly and easily using the NORAND® RT2210XL Radio Data Network

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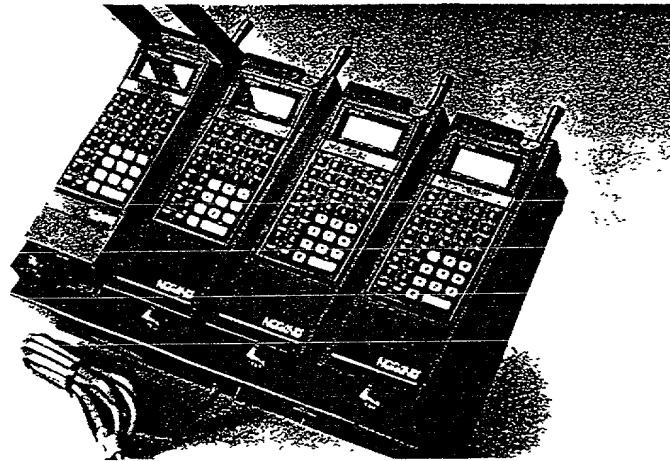
FEATURE	DESCRIPTION	ADVANTAGES
Single-unit integrated design	The two-way FM radio and the computer are built into a single-unit, lightweight design. The ruggedized RT2210XL requires no external communication interfaces or power supplies.	The RT2210XL goes easily to where data collection is required. Its small size and lightweight construction are perfect for extended, hand-held operation without fatigue. In addition, there are no tethering cables to get tangled.
Two-way interactive data communications	RT2210XL Radio Data Terminals provide instantaneous host computer access for data collection, update, and inquiry applications.	On-line computer power is available "where the action is." Personnel on the move can enter data at the source while having access to the host computer applications. Since the accuracy of data entries can be immediately verified by the host computer, errors are eliminated at the transaction level.
Nicad battery power supply	Rechargeable, nickel-cadmium battery packs provide reliable operating power for the RT2210XL.	No external power source is required. Our battery pack can provide up to 10 hours of uninterrupted use. The battery packs are interchangeable and easy to replace.
High-performance digital data radio	A uniquely designed, high performance digital data radio is the backbone of the RF data communications network.	Utilizing a radio designed specifically for two-way, digital data communications means more reliability in areas where modified voice radios will fail. Reliable message reception and top performance make the RT2210XL RF design the industry standard in excellence and value.
Bar code scanning support	All major bar code symbologies are supported in the RT2210XL. The RT2210XL also supports a variety of bar code scanning devices including CCD scanners, light pens, direct laser, and diode laser scanners.	Use of the latest in bar code identification technology provides the fastest, most accurate method of data entry. Combining scanning technology with RF data communications provides the ultimate control over operations.
Built-in audio annunciator	A built-in audio alert system can be used to inform you of operational situations.	Audible feedback alerts the operator to take appropriate action or signals the operator of a completed operation. Various uses of this feature include inbound message reception, full buffer alert, improper data entry, and properly/improperly decoded bar code.
Buffer data storage	The RT2210XL has 8K-bytes of data storage where multiple prompts and data entries are retained until they can be accurately transmitted to the host computer.	Operators may review previous entries prior to sending the data to the host computer by scrolling through the data buffer.
Operational status indicators	Indicators at the bottom of the Liquid Crystal Display (LCD) inform the user of low battery condition, keyboard "shift" mode, radio transmission, and radio reception.	Provides the user with visual feedback of terminal operating conditions and indicates corrective action.
LCD with backlighting	The LCD displays 64 characters on a 4-line screen. The high resolution provides an easy-to-read format from a wide viewing angle. The display also contains an electroluminescent panel for evenly distributed backlighting of the display.	Operators have a high-contrast, easy-to-read display that minimizes eye fatigue. The backlighting feature allows for operation in dark areas, common in many applications.
Optional direct-connect laser scanning	Popular non-contact laser scanners can be connected directly to the RT2210XL.	This option eliminates the need for costly and cumbersome external interfaces and power supplies.
Built-in diagnostic self-test	Built-in self-test is initiated any time the unit is powered-up. The self-test verifies proper operation of the microprocessor, memory, and input/output circuits.	When the unit is initially powered-up, the self-test provides the operator with a high degree of confidence the unit is operating properly.
Supports several communications protocols	In addition to our own standard ASYNC protocol, the RT2210XL can support SNA/SDLC protocol.	Allows fast implementation and greater compatibility in IBM 3270 and System 36/38 environments.

NORAND® RT2210XL Accessories for Ease and Flexibility of Use

Norand offers accessories to support the RT2210XL Radio Data Terminal. Each accessory is designed to make the RT2210XL easier to implement and use. Select the accessories to help you in your special environment or situation.

- **Battery Chargers**

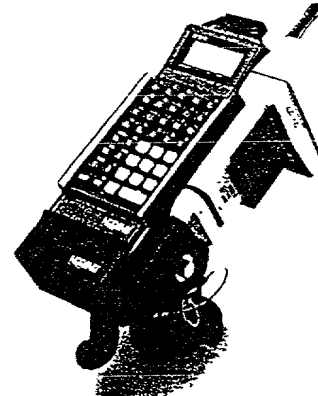
Several battery charging options are available from Norand. You can rejuvenate the battery pack of your RT2210XL by using the NC120 Single Unit Charger, or the NC146 Quad Lockbox for multiple unit, simultaneous charge.



The NC146 Quad Lockbox Charger

- **Vehicle Mount**

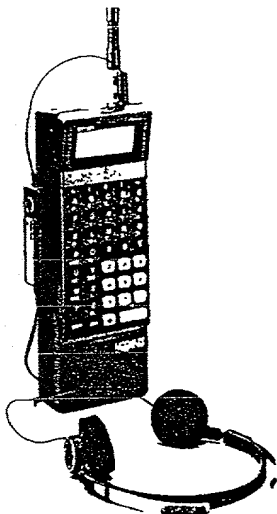
A rugged material-handling vehicle mount secures your RT2210XL when in use on a forklift truck. The mount can be installed to provide optimum accessibility for your operator and adjusts to varying angles for easy keystroke entry. The terminal slides quickly and easily out of the vehicle mount for hand-held terminal operation away from the forklift truck. A cradle on the side of the mount provides the sturdy base for supporting your scanner when not in use.



Vehicle Mount

- **Audio Headphones**

The headphones for the RT2210XL are engineered for use in obtrusive, ambient audio situations. An audio jack (next to the radio antenna mount) provides the interconnection for the headphones. Audible signals signify a properly or improperly decoded bar code symbol. The user is also alerted when new data is received from the host computer.



Audio Headphones

- **Leather Carrying Cases**

Durable leather carrying cases are available for the RT2210XL and a wide variety of scanners on the market. The heavy-grade, leather construction provides a practical accessory for your RT2210XL Radio Data Network.

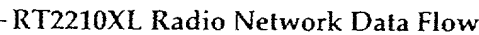
The leather carrying case for the RT2210XL can be worn across the shoulder or attached to a belt or holster for user versatility. An adjustable lock on the holster allows you to position your hand-held terminal in a variety of angles (positions) for ease of use and accessibility. Attachments for the holster are available for virtually any scanner or light pen.

THE **NEW** **YORK** **PUBLIC** **LIBRARY**

The multiplexer or controller handles the timing, protocol, and data buffering between the host computer and the RT2210XL Radio Data Terminals from Norand. When a terminal command is received from the host computer, the multiplexer (or controller) converts the command into the

The RT2210XL receives the host command from the base radio transceiver. This enables the use of either the terminal's keyboard, a bar code scanner, or both. Once the desired data has been entered, it is then transmitted back to the multiplexer (or controller) via the base radio transceiver. The multiplexer (or controller) then converts the information back into the host computer format and instantaneously transmits the data to the host computer.

Norand has radio networks available which utilize ASYNC and SNA/SDLC protocols including IBM*3270 emulation and System 36/38 compatibility. This host programming flexibility translates to a fast, cost-effective implementation.



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APPENDIX D2

Brochure entitled "RT3210 Radio
Data Terminal" (Four Sides)
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The Durability of the NORAND® RT3210 Provides the Flexibility to Fit the Way You Do Business

The new RT3210 Radio Frequency Terminal is an exceptionally designed hand-held that provides the optimum in system flexibility and durability. It's the latest in an established line of hand-held terminals and computers offered by Norand Corporation.

The RT3210's industrialized, die-cast metal alloy housing makes it the perfect fit for most any application requiring extended use... even in the most rugged environments. Tempered to withstand extremes in drop, shock, vibration, and temperature, the RT3210 is designed to meet and exceed stringent Military Specifications 810D.

FEATURES:

- Industrialized metal alloy housing for optimum durability
- Ergonomically contoured for operational ease of use and comfort
- Unique interchangeable mobile/forklift mount design for maximized flexibility
- Industry-standard 9-pin scanner connector for both 5V and 12V scanning peripherals
- Printer port 15-pin connector supports popular bar code printers



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The Versatility of the NORAND® RT3210 RF Terminal Offers Unsurpassed Value

The NORAND® RT3210 Hand-Held Terminal features the latest technological and ergonomic innovations. The solid RT3210 ensures dependable operations in the most adverse conditions.

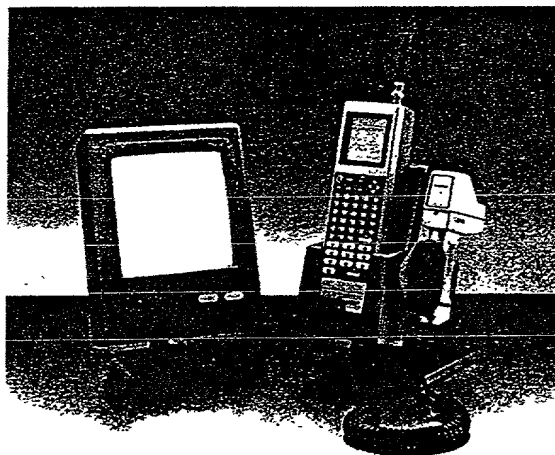
The Radio Frequency Terminal's environmentally sound construction offers the utmost in system durability. The die-cast metal alloy housing is tested to withstand drops to a concrete surface of 4-feet on 6 sides. The NORAND RT3210 redefines reliability for all applications in any environment requiring on-line wireless data communications

All application software for the RT3210 resides in the host computer and can be written in any programming language. The need for special development systems is eliminated, allowing for faster program implementation

The RT3210 extends the boundaries of computerization through two-way, radio frequency communications. It goes where



The contoured styling of the RT3210 makes it the perfect companion for ensuring pricing accuracy, receiving and tracking inventory, setting ad promotions, and performing many other operational control functions.



The uniquely designed Vehicle Communications System from Norand provides the modularity freedom to use your RT3210 Terminal in either a forklift mount application or as a hand-held.

you go, allowing you to access and update information (stored in your host system) from remote areas of your facility

• New Ergonomic Design

The contoured styling of the RT3210 conforms to the user's hand. This ergonomic styling makes extended use one of comfort and unconstrained operation.

A Super Twist LCD (liquid crystal display) provides crisp resolution in a user configurable 16 line by 21 character or 10 line by 16 character display. A contrast control adjustment feature enhances readability in varying light situations. The display also incorporates an electroluminescent backlight for use in low light and nighttime operations.

Special display features guide users through each step of operation. The terminal's status can be determined at a glance. Nine indicators at the bottom of the LCD convey the unit's state of operation. In addition, audible alerts inform the user of special

conditions and provide audible response to key strokes

Keyboard styling and function keys enhance the operational efficiency of the RT3210. The sealed 47-key alphanumeric keyboard is designed for optimum user acceptance. An integrated cursor control provides expanded mobility for rapid movement across the display screen

The hand-held terminal is powered by a 7.5 volts dc (nominal), nickel-cadmium battery. The battery pack effortlessly slides in and out of the RT3210 for expedient battery interchangeability. A latching mechanism secures the battery in the RF terminal during operation.

• Modular Approach Maximizes Flexibility

The value of the RT3210 is enhanced with the introduction of the first interchangeable Vehicle Communications System. The RT3210 can be forklift mounted or instantly removed for use as a portable hand-held terminal, independent of the material handling vehicle.

The Vehicle Communications System, consisting of the CA5950 Communications Adapter (powered) or TM3955 Terminal Mount (nonpowered) and the RD3990 Remote Display, gives you the modularity freedom to use the RT3210 hand-held terminal in an extended range of applications/situations. Each component of the Vehicle Communications System can be conveniently mounted on most any material handling equipment.

The CA5950 has the ability to power and charge the RT3210 utilizing the material handling vehicle's battery power supply. The adjustable swivel mounts (tilt and rotation) of the CA5950 and TM3955 securely hold the terminals in place and provide easy operator accessibility.

• Peripheral Connectivity for Expanded Versatility

The RT3210 is equipped with a 9-pin D-sub connector for interface to industry standard bar code scanning devices. It also supports both 5 volt and 12 volt helium-neon scanners in addition to laser diodes, CCD's, and light pens.

All major bar code symbologies are supported by the NORAND® RT3210 Hand-Held Terminal.

A printer output communications port serves as the junction for connecting the hand-held to bar code printers and other automatic identification peripherals. The 15-pin D-sub connector is located at the base of the RT3210 for easy accessibility and connectivity.

• Exclusive Automatic Baud-Rate Switching

The new third-generation digital radio of the NORAND RT3210 delivers unmatched coverage for maximized throughput. The patented automatic baud-rate switching on the RF link ensures

the fastest reliable communications of data.

The variable rate capability of the terminal constantly monitors the link and transmits at 9,600 b.p.s when conditions permit... or switches to 4,800 baud to boost transmission reliability in fringe coverage areas. A data compression feature and exclusive automatic baud-rate switching greatly enhance response time.

The RT3210 also incorporates the Norand exclusive Real-Time-Control™ system protocol. This unique RF protocol speeds response time and is exceptionally effective when numerous terminals are simultaneously in use.

• System Architecture

The RT3210 provides the link between your host computer and remote areas of your facility and operates under the control of the

host computer. The multiplexer or controller handles the timing, protocol, and data buffering between the host and the hand-held terminals. The high-performance base radio transceiver transmits the commands to the terminal.

Because the RT3210 requires no special user programming, it quickly and easily integrates into any host computer system. Host system software can be written in the language of the user's choice. A few command code additions to existing software is generally all that is needed to get the Norand system up and running in your operation. Updates, changes, and additions to the software are made solely at the host system.

The simple, yet comprehensive RF system approach from Norand is unparalleled in the industry. This philosophy makes the RT3210 the most versatile hand-held terminal on the market.



The environmentally sound RT3210 terminal and Vehicle Communications System are designed to withstand harsh industrial conditions.

RT3210 Radio Data Terminal

SPECIFICATIONS

Product Features:

Transceiver: Incorporates a 2 watt (UHF) frequency modulated (FM) radio transceiver controlled by the microprocessor. Type accepted per FCC Rules & Regulations, Parts 2 & 90, Private Land Mobile Radio Service

Liquid Crystal Display (LCD): Super Twist LCD with configurable 16 line x 21 character and 10 line x 16 character display feature (1 line of display designated for annunciators) with contrast control adjustment feature

Backlighting: LCD is backlit using an electroluminescent panel

Annunciators: TX (transmitting), RX (receiving), CL (communications loss), BATT (low battery), SHFT (shift), E (external power), ALT (alternate), FUNC (function), and + (9600 baud) are displayed on bottom line of LCD

Keyboard: Sealed elastomer 47-key alphanumeric tactile key

Self-Diagnostics: Performed on power-up with built-in user accessible diagnostics

Audio Alert: An audible buzzer is activated under host control

Static Shock Protection: Terminal is hardened against electrostatic discharge up to 20,000 volts

Shielding: Conforms to FCC Part 15 for Class A computing devices

Printer Port: 15-Pin D-Sub connector

Scanner Interface: 9-Pin D-Sub connector with selectable 5 volt and 12 volt scanning options

Hand Strap: Elastic strap (on back of terminal) secures terminal firmly in hand to facilitate handling

RAM: 64K bytes x 8 bits, nonvolatile with lithium battery back-up

ROM: 64K bytes x 8 bits

Device Features:

Microprocessor: High-performance CMOS (80C552)

Nonvolatile RAM: Provides data protection for the RAM buffer even when the terminal is turned off or the battery pack is removed

Environmental Standards: Approved by Factory Mutual Research as nonincendive for Division 2 environments for all classes and groups intrinsic safety (Division 1 environments) approval in process.

Physical Dimensions:

Size: 10.25" x 3.35" x 2.25" (LWD)
(26.04cm x 8.51cm x 5.72cm)

Antenna Length: 3.25" (8.26cm)

Weight: 42 ounces (1.2kg)

Environmental Characteristics:

Temperature

Operating: -4° to 122°F (-20° to 50°C)

Storage: -22° to 140°F (-30° to 60°C)

Recharging: 41° to 104°F (5° to 40°C)

Humidity: 0 to 90% noncondensing

Altitude: To 10,000 feet (3,048 meters) above sea level

Internal Power Source:

Battery Cells: Rapid charge nickel cadmium batteries

Voltage: 7.5 VDC (nominal)

Operating Time From Batteries: 10 hours typical, based on customer usage

RT3210 Battery Pack Characteristics:

Normal Recharge: Recharge cycle complete in less than 8 hours

Fast Charge: Fast recharge cycle complete in less than 2 hours

Standby Holding Charge: Maintains the batteries at full charge by supplying a trickle charge rate

Low Battery Indicator: Visual annunciator (BAT) indicating low battery is displayed on bottom line of LCD

Battery Pack Charging:

Charging Sources: AC adapter-type single terminal chargers, multi-terminal chargers, and multi-battery pack chargers available

Input Power: 110/220 VAC, 50/60 Hz

Electrical Safety Approvals: UL, CSA

Radio Characteristics:

Radiated Power: 2 watts (maximum)

Frequency Range: 450 to 470 MHz

RF Data Rate: 4800 baud/9600 baud

Type Certification

USA: FCC (Parts 2 & 90)

Canada: IDOC

Australia: IDOC

Mexico: SCyT

Bar Code Scanning Support

CCD Bar Code Scanners

Laser Scanners (HeNe and Laser Diode)

Pen Wands

Bar Code Symbolologies Supported

UPC/EAN, UPC/EAN with add-ons, Code 39, Extended Code 39, Encoded Code 39, Code 93, Code 128, Interleaved 2 of 5, Plessey, Codabar, ABC Codabar, Straight 2 of 5, and Computer Identics 2 of 5

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In a continuing effort to improve our products, Norand Corporation reserves the right to change specifications and features without prior notice.

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APPENDIX D3

Brochure entitled "RT3310 & RT3410
Radio Data Terminals (Four Sides)
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More RF Functionality and Value through Third-Generation NORAND® Technology

The new 3000 Series RF terminals maximize your return on investment. The RT3310 and RT3410 Radio Data Terminals are compatible with all Norand® asynchronous system components. Their third-generation Norand engineering helps ensure a reliable wireless link to your host computer from anywhere in your facilities.

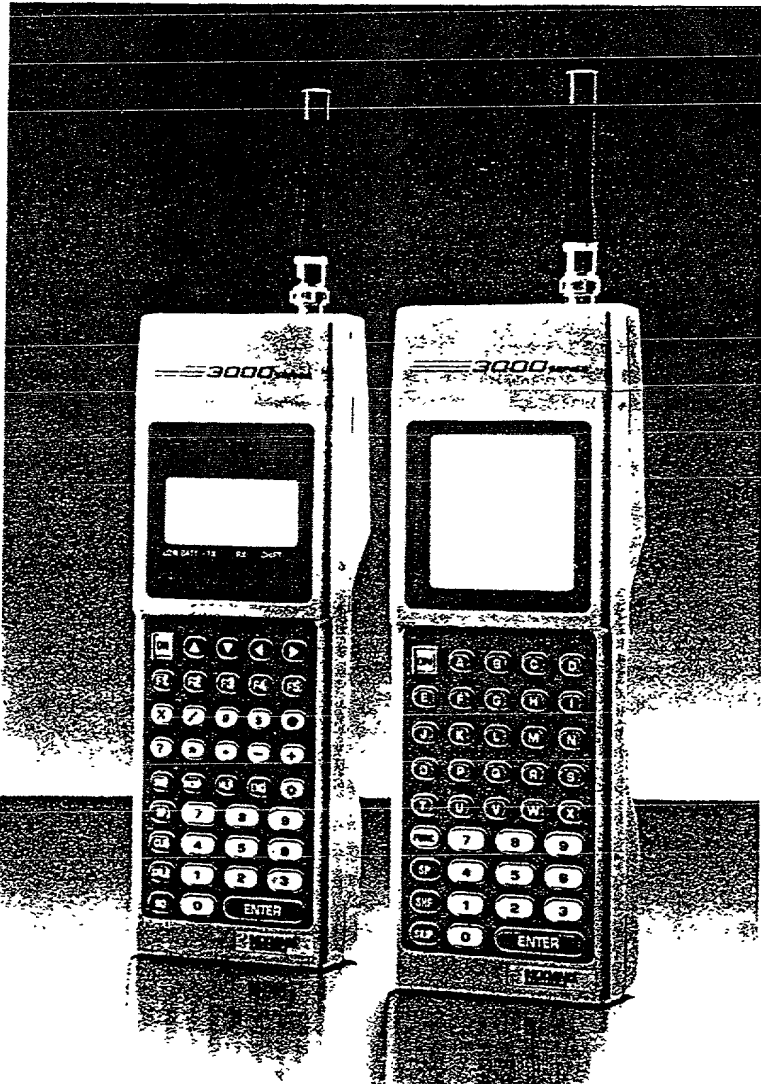
Working together with our new RM3216 multiplexer, they establish a new standard in performance, thanks to their unmatched response time. Employees can spend more time working, less time waiting for the communication of transactions.

These new terminals also set the standard in user comfort and flexibility due to their new ergonomic shape and increased connectivity.

- **The RT3310 and RT3410 Redefine Performance in RF Terminals**

RF extends the boundaries of computerization through reliable two-way radio communication. It gives you immediate access to the information in your host computer from anywhere in your facilities – and the ability to update that information in seconds.

The RT3310 and RT3410 terminals make RF even better. They give you more functionality... more versatility... and they're easier and more comfortable to use. A product of third-generation Norand technology, they're the best terminals anyone has ever offered.



FEATURES:

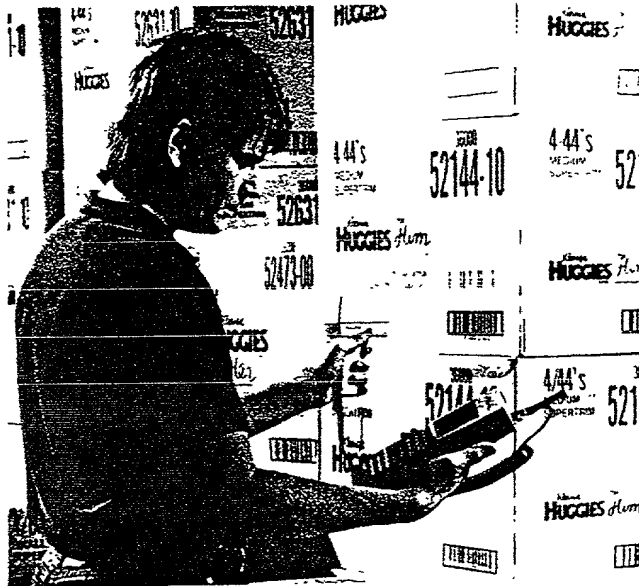
- SureGrip Design™ for comfort
- Exclusive Adaptive Polled Protocol™ for rapid response time
- Exclusive automatic baud-rate switching
- 9- and 15-pin connectors for scanners and printers

- **Easier to Hold and Use**

The 3000 Series Terminals feature our SureGrip Design™ for greater handling care. The handsome, contoured shape conforms to the natural position of the hand. A hand strap offers firm, yet gentle support to secure holding the terminal.

Special display features guide users through each step of operation. Your employees merely respond to the prompts that appear on the screen.

Both terminals can be ordered with a standard 39-key color-coded, alphanumeric keyboard or a color-coded retail application keyboard. The retail application keyboard offers five user-definable keys to simplify performing complex functions. They speed the work process by reducing the number of required keystrokes.



NORAND® RF provides on-line access of information residing in your host system. On-line access speeds the transactional process and enhances the accuracy of the data collection process.

- **Choose a 4- or 16-Line Display**

The RT3310 comes with a 4 line by 16 character display. The RT3410 offers a 16 line by 21 character display for detailed applications. The 16 line by 21 character display can also be configured to a 10 line by 16 character display for enhanced user legibility. A display package, that can upgrade your RT3310 to an RT3410 is available through the NORAND® Service Center.

The easy-to-read Super Twist liquid crystal displays (LCD) feature superior readability in varying light conditions. The display also incorporates an electroluminescent backlight for use in low light and nighttime operation.

- **More Worker Productivity**

Operating in harmony with the NORAND RM3216 multiplexer, the terminals speed work. Our exclusive Enhanced Adaptive Polled Protocol™ reduces response time through faster polling techniques and universal addressing.

Support for the RT3410's 16-line display reduces the time required to communicate data for the display.

- **Exclusive Automatic Baud-Rate Switching**

Our patented automatic baud-rate switching also improves worker productivity by ensuring the fastest reliable communication of data.

The variable rate capability of the terminal constantly monitors the RF link and transmits at 9,600 b.p.s. when conditions permit, or switches to 4,800 b.p.s. to boost the reliability of transmissions in fringe coverage areas.

The SureGrip Design™ of the 3000 Series Radio Data Terminals contours to the hand of the user for comfort and unconstrained operation.

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Our third-generation digital radio module delivers maximum coverage.

- **Greater Flexibility through Expanded Peripheral Connectivity**

The RT3310 and RT3410 are equipped with 9- and 15-pin D-sub connectors to add to their versatility.

The industry standard 9-pin bar code scanner connector supports a variety of 5-volt scanners such as laser diodes, CCDs, and light pens. These terminals support all major bar code symbologies



Ensuring pricing accuracy in retail environments is one of the many applications employed with the implementation of the 3000 Series Radio Data Systems.

The 15-pin D-sub connector allows the connection of bar code printers and other automatic identification peripherals

It allows the connection of the new NP3800 printer for creating bar codes in remote areas. Completely portable with its own power source, the NP3800 will print shelf labels or tag stock wherever it is needed.

- **Reliable Rechargeable Battery Power**

Both terminals are powered by a 7.5 volt DC (nominal) nickel-cadmium battery. The battery pack slides in and out of the terminal easily for fast battery replacement

A latching mechanism secures the battery in the terminal during operation.

- **A Simpler Architecture**

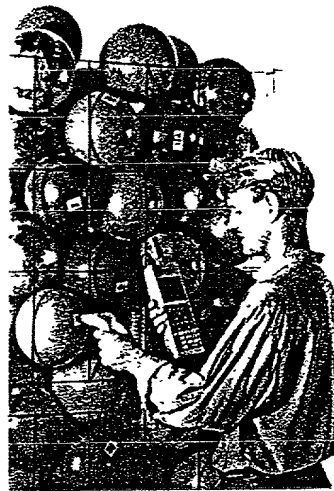
The advantages of the RT3310 and RT3410 lie within their unique system architecture. All software resides in your host computer and can be written in any programming language

The need for special development systems is eliminated, allowing faster program implementation. A few command code additions to existing software is generally all that is needed to get the system up and running.

This simple approach helps improve the reliability of the terminal because it eliminates unnecessary replacement ROM chips. It also allows easier program updates, changes, and additions. Instead of updating each terminal in your RF network, you merely update the host software.

The RT3310 and RT3410 terminals are part of the advanced 3000 Series RF network systems from Norand. The RM3216 multiplexer handles timing, protocol, and data buffering between the host and the hand-held terminals. And the RB2212 high-performance base radio transceiver facilitates reliable radio communication between the host and the terminals.

A number of other components and accessories complete making the most of RF for you.



The 3000 Series Radio Data System easily integrates into any host computer system. A few command code additions to existing software is generally all that is needed to get the Norand® system up and running in your operation.

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In a continuing effort to improve our products, Norand Corporation reserves the right to change specifications and features without prior notice.

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Introducing the NORAND® RT1000 Radio Data Terminal, Your Lightweight On-Line Productivity Tool that Fits in the Palm of Your Hand

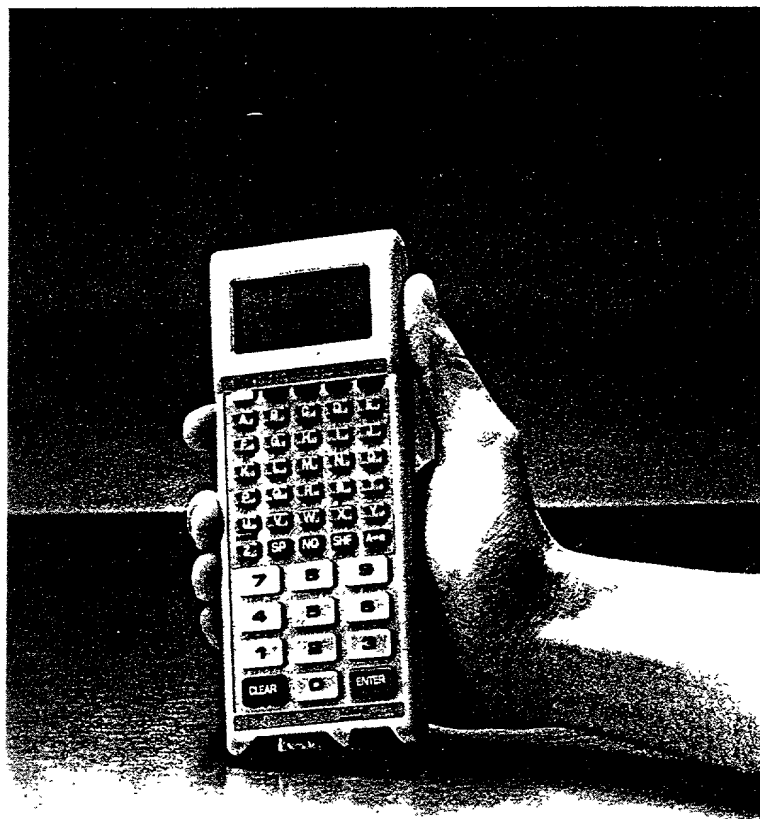
Norand Corporation announces the newest addition to its family of products... the RT1000 Radio Data Terminal. This hand-held radio terminal is packed with the features you've been asking for and offers the advantages of on-line, real-time communications at a price guaranteed to maximize your company's return on investment.

This radio frequency (RF) terminal is so compact and lightweight it can fit into your shirt pocket. No other terminal comes close to matching the value offered by the RT1000 Radio Data Terminal.

The RT1000 Terminal features a 47-key alphanumeric keyboard with 4 soft-programmable keys, defined by the application software and downloaded when the terminal is initialized. A shift mode on the keyboard allows selection for up to 8 programmable characters along with upper case and lower case support. This keyboard layout makes it ideal for domestic and international applications requiring unique character sets.

The terminal incorporates a 4-line by 16-character liquid crystal display. The large characters on the Reflective Super Twist display enhance readability, even in low light environments.

The innovative architecture of the RT1000 Radio Data Terminal includes a central processor unit and analog board incorporating surface-mount, memory-on-chip technology. In addition, a patented self-contained, removable radio module gives the user the flexibility to change



operating frequency on the spot. This unique modular design makes the RT1000 one of the most versatile, reliable, and serviceable products on the market.

The RT1000 is the ideal choice for new and current NORAND® RF users who are looking for a compact, lightweight, attractively priced solution to their data collection process. The backward and forward compatibility of the RT1000 Radio Data Terminal makes future upgrades quick and easy to implement. This insures the value of your investment now and for years to come.

FEATURES:

- Simple to install and use
- Interchangeable radio module
- Compatible with all current production Norand® products
- Compact functionality for maximized value

RT1000 Radio Data Terminal

SPECIFICATIONS

Product Features:

Transceiver: Incorporates a 1 watt (UHF) frequency modulated (FM) radio transceiver controlled by the microprocessor. Type accepted per FCC Rules & Regulations, Parts 2 & 90, Private Land Mobile Radio Service

Liquid Crystal Display (LCD): 4-line x 16-character Reflective Super Twist LCD

Keyboard: Elastomer 47-key alphanumeric with 4 soft-programmable character keys (8 special characters possible with shift key engaged)

Annunciators: Battery recharge indicator on the terminal's LCD

Radio Module: Patented self-contained, interchangeable 1-channel radio module with built-in receiver self-test

Radio Antenna: Stud-mount, screw-in antenna connects directly to the end of the radio module

Drop Survival: Designed to withstand 4-foot drop to concrete

Hand Strap: Incorporates a user replaceable, elastic hand strap to secure the terminal firmly in hand

Belt Attachment Point: Removable clip allows terminal to be fastened to the belt

Device Features:

Central Processor Unit: 16-bit microcontroller

Shielding: Conforms to FCC Part 15 for Class A computing devices

Audible Tone: Audible annunciator to alert operator of action

Scanner Interface: 9-pin D-subminiature connector for interface to 5 volt scanning peripherals with built-in scanning self-test

Electrostatic Discharge: Designed to withstand up to 20kV for Class C products

RAM: 512 bytes x 8 bits

ROM: 16K bytes x 8 bits (masked)

Physical Dimensions:

Size: 6.875" x 2.625" x 1.25" (LWD)
(17.46cm x 6.68cm x 3.18cm)

Antenna Length: 2" (5.08cm)

Weight: 14.25 ounces (404g)

Environmental Characteristics:

Temperature:

Operating: 32° to 122°F
(-0° to 50°C)

Storage: -22° to 158°F
(-30° to 70°C)

Recharging: 41° to 104°F
(5° to 40°C)

Humidity: 10 to 90% noncondensing

Altitude: To 10,000 feet (3,048 meters) above sea level

Internal Power Source:

Battery Cells: Standard rechargeable nickel-cadmium battery pack

Voltage: 7.2 VDC (nominal)

Operating Time Between Charges: 8 hours typical, based on customer usage of 8 scans/transmissions per minute

RT1000 Battery Pack Characteristics:

Normal Recharge: Complete in less than 8 hours

Pack Life: At least 500 discharge/charge cycles

Low Battery Indicator: Visual annunciator indicating low battery is displayed on the LCD

Battery Pack Charging:

Charging Sources: AC adapter-type single terminal chargers and multi-battery pack chargers available

Radio Characteristics:

Radiated Power: 1 watt (maximum)

Frequency Range: 450 to 470 MHz

RF Data Rate: 4800 baud

Bar Code Scanning Support:

CCD (5V)

Visible Laser Diode (5V)

Pen Wand (5V)

Bar Code Symbolologies Supported

UPC, UPC with add-ons, EAN,

EAN with add-ons, Code 39,

Interleaved 2 of 5, Code 128, Plessey

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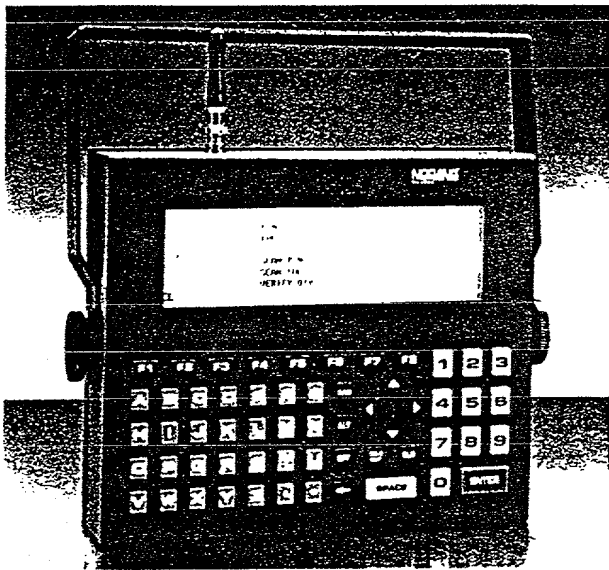
APPENDIX D5

Brochure entitled "RT5910 Mobile
Mount Radio Terminal (Two Sides).
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The NORAND® RT5910 Mobile Mount
Terminal for Challenging
Industrial Environments

RT5910
Mobile Mount
Radio Terminal



SYSTEM FEATURES

- Long life Super Twist Transflective 16-line x 80-character liquid crystal display with graphic display capabilities
- Sealed elastomer 58-key alphanumeric with 32 function keyboard
- Peripheral port (sealed) 15-pin male D-subminiature for connection to RS232 devices
- Scanner interface (sealed) 9-pin D-subminiature connector for 5 volt scanning
- Rugged case enclosure built to NEMA 3 standards for harsh environments
- Incorporates the same display screen formatting as the RT3210 Radio Data Terminal and the RD3990 Remote Display for application transparency

The RT5910 Mobile Mount Terminal is the newest member of the NORAND® Radio Frequency (RF) Vehicle Communications System. The RT5910 Terminal's rugged design was developed for the harshest forklift-mount applications.

The Super Twist Transflective liquid crystal display (LCD) of the RT5910 has graphic display capabilities for enhanced readability and versatility. The LCD is backlit using an amber light emitting diode (LED) light pipe and is designed to operate for 50,000 to 75,000 hours without failure.

The display screen formatting of the RT5910 is compatible with the screen formats used in the RT3210 Radio Data Terminal and RD3990 Remote Display. The achievement of this application transparency allows the duplication of display screens without the need for host system software modifications.

The RT5910 Terminal is designed to meet NEMA 3 standards and incorporates a sealed elastomer keyboard. This 58-key alphanumeric keyboard has 32 function keys to simplify and speed the data entry process. The oversized keys are ideal for the large-handed or gloved user.

The Mobile Mount Radio Terminal supports 5 volt scanning. Also, a 15-pin RS232 port allows connection to a variety of peripherals such as bar code printers and other data collection devices.

The innovative architecture of the RT5910 requires no special user programming and integrates quickly and easily into any host computer system. A few command code additions to existing software is generally all that is needed to get the system up and running in your operation. This simple, yet comprehensive RF system approach from Norand is unparalleled in the industry.

NORAND®
DATA SYSTEMS

RT5910 Mobile Mount Radio Terminal

SPECIFICATIONS

PRODUCT FEATURES

Transceiver: Incorporates a 2 watt (UHF) frequency modulated (FM) radio transceiver controlled by a microprocessor. Type accepted per FCC Rules & Regulations, Parts 2 & 90 Private Land Mobile Radio Service

Liquid Crystal Display (LCD): Super Twist Transflective LCD with configurable 16-line x 80-character display (one line of display designated for annunciators) with contrast control adjustment feature

Backlighting: LCD is backlit using an amber light emitting diode (LED) light pipe

Annunciators: TX (transmitting), RX (receiving), CL (communications loss), ALT (alternate), FUNC (function), and + (9600 baud), are displayed on the bottom line of the LCD

Keyboard: Sealed elastomer 58-key alphanumeric tactile feel with 32 function keys ABCD & QWERTY options

Audio Alert: An audible buzzer which is volume controlled via the keyboard

Self-Diagnostics: Performed on power-up with built-in user accessible diagnostics

Static Shock Protection: RT5910 Mobile Mount Radio is hardened against electrostatic discharge up to 20,000 volts

Shielding: Conforms to FCC Part 15 for Class A computing devices

RS232 Support: A sealed 15-pin male D-subminiature connector allows connection to a variety of peripherals such as bar code printers and other data collection devices

Scanner Port: A sealed 9-pin D-subminiature connector with 5 volt scanning capability

Power Input Connector: A sealed 2-pin circular locking connector for power connection

Power Conversion: Converts up to 72VDC forklift battery to 12VDC operating voltage

RAM: 128K bytes x 8 bits, nonvolatile with lithium battery backup

ROM: 190K bytes x 8 bits

Microprocessor: 16 bit

PHYSICAL CHARACTERISTICS

Size: 12.5" x 10" x 3" (LWD)
(31.75cm x 25.4cm x 7.62cm)

Antenna Length: 3.25 inches (8.25cm)

Weight: 12 pounds (5.4kg)

ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: -4° to 140°F (-20° to 60°C)

Storage Temperature: -22° to 158°F (-30° to 70°C)

Humidity: 0 to 90% noncondensing

Standards: Designed to meet UL, CSA, and NEMA 3 standards and MIL-STD-810D

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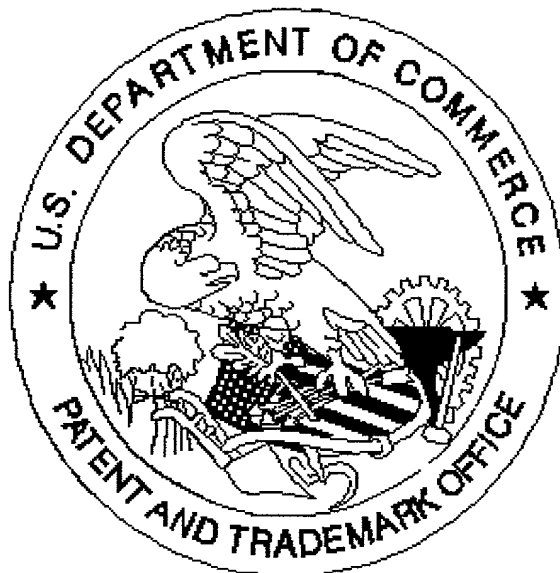
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